Language Learning & Technology
http://llt.msu.edu/vol4num2/kasper/default.html

September 2000, Volume 4, Number 2
pp. 96-116 online
(page numbers in PDF differ and should not be used for reference)

NEW TECHNOLOGIES, NEW LITERACIES: FOCUS DISCIPLINE RESEARCH AND ESL LEARNING COMMUNITIES

Loretta F. Kasper
Kingsborough Community College/CUNY

ABSTRACT

This paper describes a classroom study of a content-based instructional model that engages high intermediate[1] ESL students in sustained content study within collaborative learning communities and uses information technology resources to hone linguistic, academic, socioaffective, and metacognitive skills through an activity called focus discipline research (Kasper, 1998a). The paper describes how focus discipline research derives from the principles of cognitive learning theory and second language acquisition research and how it incorporates the four critical elements of a pedagogy of multiliteracies as outlined by The New London Group (1996). The paper goes on to detail the study, illustrating how pedagogical activities engaged students in situated practice, overt instruction, critical framing, and transformed practice, and it concludes by offering both quantitative and qualitative support for the efficacy of focus discipline research in promoting "multiliteracies."

DEFINING AND ACQUIRING LITERACY IN THE AGE OF INFORMATION

Moll defined literacy as "a particular way of using language for a variety of purposes, as a sociocultural practice with intellectual significance" (1994, p. 201). While traditional definitions of literacy have focused on reading and writing, the definition of literacy today is more complex. The process of becoming literate today involves more than learning how to use language effectively; rather, the process amplifies and changes both the cognitive and the linguistic functioning of the individual in society. One who is literate knows how to gather, analyze, and use information resources to solve problems and make decisions, as well as how to learn both independently and cooperatively. Ultimately literate individuals possess a range of skills that enable them to participate fully in all aspects of modern society, from the workforce to the family to the academic community. Indeed, the development of literacy is "a dynamic and ongoing process of perpetual transformation" (Neilsen, 1989, p. 5), whose evolution is influenced by a person's interests, cultures, and experiences. Researchers have viewed literacy as a multifaceted concept for a number of years (Johns, 1997). However, succeeding in a digital, information-oriented society demands multiliteracies, that is, competence in an even more diverse set of functional, academic, critical, and electronic skills.

To be considered multiliterate, students today must acquire a battery of skills that will enable them to take advantage of the diverse modes of communication made possible by new technologies and to participate in global learning communities. Although becoming multiliterate is not an easy task for any student, it is especially difficult for ESL students operating in a second language. In their attempts to become multiliterate, ESL students must acquire linguistic competence in a new language and at the same time develop the cognitive and sociocultural skills necessary to gain access into the social, academic, and workforce environments of the 21st century. They must become functionally literate, able to speak, understand, read, and write English, as well as use English to acquire, articulate and expand their knowledge. They must also become academically literate, able to read and understand interdisciplinary texts, analyze and respond to those texts through various modes of written and oral discourse, and expand their knowledge through sustained and focused research. Further, they must become critically literate, defined here as the ability to evaluate the validity and reliability of informational sources so that they may

draw appropriate conclusions from their research efforts. Finally, in our digital age of information, students must become electronically literate, able "to *select* and *use* electronic tools for communication, construction, research, and autonomous learning" (Shetzer, 1998).

Helping students develop the range of literacies they need to enter and succeed at various levels of the academic hierarchy and subsequently in the workforce requires a pedagogy that facilitates and hastens linguistic proficiency development, familiarizes students with the requirements and conventions of academic discourse, and supports the use of critical thinking and higher order cognitive processes. A large body of research conducted over the past decade (see, e.g., Benesch, 1988; Brinton, Snow, & Wesche, 1989; Crandall, 1993; Kasper, 1997a, 2000a; Pally, 2000; Snow & Brinton, 1997) has shown that content-based instruction (CBI) is highly effective in helping ESL students develop the literacies they need to be successful in academic and workforce environments.

CONTENT-BASED INSTRUCTION AND LITERACY DEVELOPMENT

CBI develops linguistic competence and functional literacy by exposing ESL learners to interdisciplinary input that consists of both "everyday" communicative and academic language (Cummins, 1981; Mohan, 1990; Spanos, 1989) and that contains a wide range of vocabulary, forms, registers, and pragmatic functions (Snow, Met, & Genesee, 1989; Zuengler & Brinton, 1997). Because content-based pedagogy encourages students to use English to gather, synthesize, evaluate, and articulate interdisciplinary information and knowledge (Pally, 1997), it also allows them to hone academic and critical literacy skills as they practice appropriate patterns of academic discourse (Kasper, 2000b) and become familiar with sociolinguistic conventions relating to audience and purpose (Soter, 1990).

The theoretical foundations supporting a content-based model of ESL instruction derive from cognitive learning theory and second language acquisition (SLA) research. Cognitive learning theory posits that in the process of acquiring literacy skills, students progress through a series of three stages, the cognitive, the associative, and the autonomous (Anderson, 1983a). Progression through these stages is facilitated by scaffolding, which involves providing extensive instructional support during the initial stages of learning and gradually removing this support as students become more proficient at the task (Chamot & O'Malley, 1994). Second language acquisition (SLA) research emphasizes that literacy development can be facilitated by providing multiple opportunities for learners to interact in communicative contexts with authentic, linguistically challenging materials that are relevant to their personal and educational goals (see, e.g., Brinton, et al., 1989; Kasper, 2000a; Krashen, 1982; Snow & Brinton, 1997; Snow, et al., 1989).

In a 1996 paper published in *The Harvard Educational Review,* The New London Group (NLG) advocated developing multiliteracies through a pedagogy that involves a complex interaction of four factors which they called *Situated Practice, Overt Instruction, Critical Framing,* and *Transformed Practice*. According to the NLG, becoming multiliterate requires critical engagement in relevant tasks, interaction with diverse forms of communication made possible by electronic technologies, and participation in collaborative learning contexts. Warschauer (1999) concurred and stated that a pedagogy of critical inquiry and problem solving that provides the context for "authentic and collaborative projects and analyses" (p. 16) that support and are supported by the use of electronic technologies is necessary for ESL students to acquire the linguistic, social, and technological competencies key to literacy in a digital world.

According to a 1995 report published by the United States Department of Education, "technology is an important enabler for classes organized around complex, authentic tasks" and when "used in support of challenging projects, [technology] can contribute to students' sense ... that they are using real tools for real purposes." Technology use increases students' motivation as it promotes their active engagement with language and content through authentic, challenging tasks that are interdisciplinary in nature (McGrath,

1998). Technology use also encourages students to spend more time on task. As they search for information in a hyperlinked environment, ESL students benefit from increased opportunities to process linguistic and content information. Used as a tool for learning, technology supports a level of task authenticity and complexity that fits well with the interdisciplinary work inherent in content-based instruction and that promotes the acquisition of multiliteracies.

THEORY INTO PRACTICE

These research findings suggest that in our efforts to prepare ESL students for the challenges of the academic and workforce environments of the 21st century, we should adopt a pedagogical model that incorporates information technology as an integral component and that specifically targets the development of the range of literacies deemed necessary for success in a digital, information-oriented society. This paper describes a content-based pedagogy, which I call *focus discipline research* (Kasper, 1998a), and presents the results of a classroom study conducted to measure the effects of focus discipline research on the development of ESL students' literacy skills.

As described here, focus discipline research puts theory into practice as it incorporates the principles of cognitive learning theory, SLA research, and the four components of the NLG's (1996) pedagogy of multiliteracies. Through pedagogical activities that provide the context for situated practice, overt instruction, critical framing, and transformed practice, focus discipline research promotes ESL students' choice of and responsibility for course content, engages them in extended practice with linguistic structures and interdisciplinary material, and encourages them to become "content experts" in a subject of their own choosing.

Students work both individually and as members of collaborative learning communities, called focus discipline groups, to complete a range of writing assignments of progressive complexity, beginning with shorter pieces of two to three pages and culminating in two extended research projects of five to seven pages each. As they carry out their research and compose their essays and projects, ESL students become familiar with the discourse patterns, rhetorical conventions, and conceptual content of their chosen fields of study and learn how to further knowledge by networking with peers and experts in those fields. Information technology use is key to the process because the extended research that is integral to sustained and focused content study is more effectively carried out when an extensive body of instructional and informational resources is available. (Kasper, 2000b).

Because it promotes close reading and in-depth discussion of salient interdisciplinary issues, focus discipline research helps students acquire the linguistic and cognitive skills that they need to succeed in an English-speaking academic environment. As students join in collaborative teams to pursue their own interests through extended and focused research of content that is personally relevant and important to the fulfillment of both academic and professional goals, they effectively build linguistic competency and develop the range of skills defined as multiliteracies.

PEDAGOGICAL CONCERNS

The classroom study described here was designed to measure the efficacy of the focus discipline research model in addressing several pedagogical concerns that were especially relevant to students at my college. Due to newly implemented university regulations on developmental programs, in order to maintain matriculation and full time status, students need to pass institutional reading and writing assessments within a period of two semesters. Unfortunately, many ESL students at my college are multiple repeaters and their failure rate on institutional assessments is high. Moreover, even those who pass these examinations often remain underprepared for the rigors of the mainstream college curriculum, and so many never complete their degree programs (see, e.g., Kasper, 1997a, 1998b).

Because semesters at my college are only 12 weeks in length, pedagogy was needed to help ESL students quickly develop and strengthen the range of skills required to pass institutional reading and writing examinations and to enter and succeed in mainstream college courses. To help students meet these needs, I developed a content-based pedagogy of focus discipline research designed to target and build competence in each of the functional, academic, critical, and electronic literacies deemed necessary for a successful academic experience. Evaluating the results of this pedagogical approach was the purpose of the present study.

PARTICIPANTS IN THE STUDY

The participants in this classroom study were 50 students enrolled in two sections of my ESL 91 course. ESL 91 represents the high intermediate level 1[2] at my college and is an integrated reading/writing course, which meets 6 hours per week over a twelve-week semester. The students in my ESL 91 course came from a diverse set of linguistic and ethnic backgrounds and were representative of the general ESL population at my college. Most of the students were Russian; the remaining students were Haitian, Dominican, Asian, Indian, and Arab.

It is important to note that in this classroom study there was no random assignment of subjects. The students who participated in the study were those who registered for my two sections of ESL 91. Students at my college placed into ESL 91 based on their scores on reading and writing examinations taken upon entry into the university. The reading examination is the DTLS (Descriptive Test of Language Skills), a 45-minute timed reading comprehension examination developed by The College Board (1978). The DTLS presents students with a variety of short reading passages, each of which is followed by three to five multiple choice items, for a total of 40 questions. The writing examination is the CUNY Writing Assessment Test (CWAT). The CWAT gives students 50 minutes to write an expository essay on their choice of one of two possible topics. The test is scored according to a six-point scale aimed at defining "minimal readiness" for freshman composition; minimal readiness is defined as a score of four or higher by two independent raters (CUNY Task Force on Writing, 1983). The students who placed in the ESL 91 classes involved in the study described here had scored 2-2 on the CWAT and between 18-23 on the DTLS; these entry scores are typical and representative of the overall ESL 91 population at my college.

RESEARCH QUESTIONS

This study addressed three research questions. First, it examined Whether focus discipline research facilitated students' acquisition of the basic literacy skills considered necessary for college level work. For the purposes of this study, these basic literacy skills were reading and writing and were quantified by student pass rates on separate institutionally mandated reading and writing examinations taken at the end of the semester. The study attempted to determine whether focus discipline research had a significant impact on student performance, as measured by each of these reading and writing examinations. Specifically, when compared with other ESL students at the same level of instruction, did the students who engaged in focus discipline research over the course of the twelve-week semester attain significantly higher pass rates on the end-of-semester reading and writing assessments?

The second research question relates to academic promotion. According to departmental and college regulations, ESL 91 students who pass both the reading and the writing assessments are able to skip a level of instruction. Given these regulations, a pedagogy that enables students to progress more rapidly through the developmental sequence offers them a better chance to fulfill their educational goals. The second research question therefore was, When compared with other ESL 91 students, are students who engage in focus discipline research more likely to pass both reading and writing tests and therefore able to skip a level of instruction?

Because electronic literacy now counts among the basic skills necessary for success in college and the workforce, finding ways to use technology to support curricular objectives has become increasingly important. Focus discipline research pedagogy is inherently task-based, student-centered, and project-oriented and so offers a natural context for the integration of technology into instruction. Unfortunately, although many educators have extolled the value of technology in facilitating student performance, little research has been done to support this belief (Brown, 2000). For this reason, the present study also examined the effect of extensive technology use in focus discipline research.

Technology was naturally integrated into the course since the students who participated in the study described here were also part of a content-based Internet project begun during the semester of the study. The project involved students in two sections of ESL 91 taught by the author and two additional classes of ESL students, one at a college in Buffalo, New York and the other at a college in Kiev, The Ukraine. All of the students participating in the Internet project were at the high intermediate level and they were all independently researching and writing about the same focus discipline topics. Although all students were doing focus discipline research, the general structure of the courses was not necessarily the same at each school and students were subject to different types of assessments. For this reason, only the performance of the ESL students at my college (Kingsborough Community College) was considered for the purposes of this study.

The third research question was, Does technology use in focus discipline research have a significant impact on ESL 91 students' performance on tests of reading and writing? Assessing the impact of technology on focus discipline research required comparing the performance of students in this study with those who had been in my ESL 91 classes in semesters prior to electronic technology resources being made available to ESL students. At that time, my focus discipline research pedagogy involved having students work in groups, as they did here, but having them use traditional print resources available in the college library for their research. The reading texts and writing prompts were the same as those used here, as were the institutional assessments that students were required to take at the end of the semester. Therefore, assessing the impact of technology on literacy development necessitated a post hoc comparison of the scores of ESL 91 students who used information technology resources in their focus discipline research with those of students who had used only traditional library resources in their focus discipline research.

Finally, because focus discipline research pedagogy encourages students to assume an active role in the learning process, their views on this pedagogy and its relationship to literacy skill acquisition can provide valuable insights into, and suggestions for improving, the process. For this reason, students were asked to complete online feedback questionnaires at the end of the semester. These feedback questionnaires asked students to evaluate the usefulness of focus discipline research, the value of working in groups, and to offer their insights on the experience of engaging in extended interdisciplinary study and writing research projects.

FOCUS DISCIPLINE RESEARCH AND THE DEVELOPMENT OF MULTILITERCIES

Becoming multiliterate requires developing competence in a range of functional, academic, critical, and electronic skills. As students become more proficient in each of these skills, they acquire the knowledge necessary to attain passing scores on institutional assessments, enter the mainstream academic curriculum, and move toward fulfilling their academic and professional goals. As suggested by the NLG (1996), the development of multiliteracies requires a pedagogy that incorporates four critical factors: situated practice, overt instruction, critical framing, and transformed practice. These principles will be defined briefly here and discussed extensively in subsequent sections of this paper.

The NLG (1996) defined *situated practice* as "immersion in meaningful practices within a community of learners [and experts] who are capable of playing multiple and different roles based on their backgrounds

and experiences" (p. 85). Thus, situated practice facilitates literacy development through an authentic learning environment that provides direct experience with tasks students value and intellectual stimulation from teachers and peers who ask thoughtful questions and provide supportive coaching.

Overt instruction refers to "active interventions on the part of the teacher and other experts that scaffold learning activities. . .[to] allow the learner to gain explicit information. . .when it can most usefully organize and guide practice" (p. 86). The goal of overt instruction is to enable the learner to gain "conscious awareness of and control over what is being learned," and meeting this goal requires an interaction between students and teacher that allows learners "to accomplish a task more complex than they could accomplish on their own" (NLG, 1996, p. 86).

Critical framing encourages learners to evaluate what they have learned, to constructively critique that learning, and to creatively extend and apply it to new contexts (NLG, 1996, p. 87). *Transformed practice* is designed to help students simultaneously apply and revise what they have learned and then to put this understanding to work in reaching their own goals and fulfilling their own values (NLG, 1996, p. 87). The NLG stated that transformed practice requires juxtaposing and integrating "discourses or social identities or 'interests' that have historically been at odds" (p. 87) and in so doing creates a certain degree of tension in the learner.

Through activities that engage students in situated practice, overt instruction, critical framing, and transformed practice, focus discipline research represents a content-based pedagogy which supports the principles advocated by the work of the NLG as it targets the literacy skills necessary for students' success in the academic and workforce environments of the 21st century. It is important to note here that none of these four factors alone is sufficient; each is necessary for effective literacy learning to take place. The following sections of this paper will detail how the focus discipline research model used in the study described here incorporated these four pedagogical principles. Each of the four pedagogical principles will be discussed separately; however, it is important to note that they often worked interactively with each other in many of the activities described.

Situated Practice

In this study, focus discipline research incorporated situated practice in a number of ways. From the subject areas studied in the course, [3] students chose one focus discipline to research in depth for the entire semester. Students based their choice on personal interest and/or college major, so that they were invested in a personally meaningful and important learning experience. The focus disciplines chosen by students in this study were psychology, computer science, biology, sociology, diet and nutrition, business, and physical anthropology. All of the students said that they had chosen a focus discipline that was related to their future career plans. Students who chose to study the same focus discipline worked together in collaborative learning communities called focus discipline groups.

Focus discipline tasks were designed to provide ample opportunities for ESL students to use English to gather, synthesize, and evaluate a range of informational resources and to construct responses using appropriate discourse patterns. Each student produced a series of written reports and a research project, and each focus discipline group produced a group research project. All written work was based upon assigned topics within their focus discipline and required students to define problems, to examine evidence collected from a variety of sources, and to make objective judgments on the basis of their extended focus discipline research.

Although it is possible for students to engage in focus discipline research without the assistance of electronic technologies, these technologies offer students unique benefits and support the curricular objectives inherent in this content-based pedagogical model. Technology makes available a vast range of resources at the click of a mouse. This vast range of resources exposes students to a variety of

perspectives on key interdisciplinary issues. Students are then guided by the teacher through instructional activities that encourage them to take a critical stance on the issues presented. Here, situated practice interacts with overt instruction and critical framing to provide students with a powerful context for developing critical literacy skills as they read and evaluate the resources they find on the Internet. Moreover, technology provides the means and the motivation for students to share resources and discuss their research with an audience outside of the immediate physical classroom.

Because it offers so many benefits to focus discipline research and because these ESL 91 classes were part of a content-based Internet project, technology was a key component of the present study. Students in this study were required to use Internet technologies to complete their focus discipline tasks. Each student was given an Internet account by the college.[4] Students used these accounts to subscribe to CBESL, an e-mail discussion list set up specifically for this course and the Internet project. They were required to post a minimum of one message per week to CBESL. The format of these postings was sometimes student-chosen, sometimes teacher-directed. Student-chosen postings took the form of requests for information about topics studied, suggestions for how to search for information, descriptions of resources found and responses to posts from other students, either those in one of my ESL 91 classes or those at the other colleges participating in the Internet project. Teacher-directed postings required students to summarize the results of their research on a given topic or to compose a reader response to student essays that had been published on the course Web page.

ESL students in this study honed English language skills, built their overall knowledge base, and developed multiliteracies through their use of text-based computer-mediated communication (CMC), intensive reading and research using Internet hypertext documents, and their production of written essays and individual and group research projects based on their research efforts. As these students conducted research in their focus disciplines, they made extensive use of hypertext documents available on the Internet. Internet hypertext facilitated students' acquisition of complex knowledge by providing easy access to multiple cross-references on related topics across several documents, or screens, enabling a natural juxtaposition of ideas, and allowing students a flexible means of exploring those ideas. (Tierney, Kieffer, Whalin, Desai, Moss, Harris, & Hopper, 1997). As students explored hyperlinks to produce a text determined by their own interests and purposes, they actively engaged in a process of acquiring and creating complex knowledge (Warschauer, 1999). Students' acquisition of knowledge was further facilitated through graphic illustrations on Web pages which helped to consolidate and concretize abstract content-based concepts by encouraging multi-modal processing of both visual and verbal cues as presented on the Internet page (Chun & Plass, 1997).5

As outlined by the NLG (1996), situated practice advocates that students and teachers play multiple roles during the learning process. In keeping with the pedagogical principles underlying focus discipline research, both the instructor and the students in this study assumed multiple roles, and sometimes alternated these roles. In the context of the focus discipline research pedagogy investigated here, the instructor was both a knowledge sharer and a resident expert in the subject areas studied in the course. The instructor structured the activities, guided the students in carrying them out, and was a facilitator of the learning process. For example, the focus discipline research topics used in this study were instructor-generated; the prompts were designed to provide students with a clear direction for their research. In keeping with the goal of using technology to support and facilitate curricular objectives, each focus discipline assignment was posted to the course Web page. In addition, weekly assignments were e-mailed to the class. Because some students were not familiar with Web browsers when they began the course, these e-mails often contained hyperlinks. This made it easier for all students to access the online course materials.

In the context of focus discipline research, the instructor's role went beyond that of a knowledge provider; rather, the instructor regularly joined each focus discipline group as a "colleague" who listened and posed questions within the context of discussions begun by the students. Therefore, the instructor became "a

sage who guided both on the stage and on the side." In the focus discipline research model, the instructor is "a sage" in that he or she has background in the subject areas studied, has researched and gathered references in each discipline, and therefore is able to offer students both structure and guidance. Yet, rather than creating knowledge for students in a teacher-centered model, here the instructor joined students as they discussed and worked through readings, encouraging them to discover and expand knowledge through their own efforts and providing them with constructive feedback throughout the process.

Like the instructor, the students in this study assumed multiple roles through their participation in focus discipline groups. The focus discipline group offered ESL students the opportunity to become part of a diverse community of learners who worked together to construct knowledge. In the study described here, students began by researching topics on their own and then joining with the group to summarize and evaluate each of the sources found. The learning environment created through collaborative focus discipline research encouraged students to view their peers as additional knowledge resources, each who brought his or her own unique perspective on the issues and topics studied (as well as his or her own personal reason for studying them). Multiliteracies were developed as students engaged in social and academic discourse with focus discipline group members, elaborating and reflecting on both their own ideas and those of their peers.

Computer-mediated-communication (CMC) networks afforded further possibilities for communication and knowledge representation by making it possible for students to share their thoughts with a global community, thereby extending the collaborative learning context beyond the physical classroom. To enable students to take full advantage of the power of extended learning communities, Luke and Elkins (1998) suggested that literacy education train students to deal with emergent technologies and environments, "preparing them for new forms of social participation and linking their voices and communities with those of their counterparts in other cultures and worlds" (p. 6).

As part of their focus discipline research, the ESL students in this study developed skill in using a variety of discourses key to multiliteracies through their participation in e-mail and electronic bulletin board discussions via CBESL. These electronic discussions provided students with a context in which to collaborate not only with peers in the physical classroom, but also with students in other parts of the country and the world. As explained previously, these other students, some as far away as Kiev, were also researching and writing about the same focus discipline topics. Technology therefore expanded the peer network and the focus discipline group and created a global learning community. Their participation in CMC networks provided these ESL students with valuable informational resources, an opportunity to join point-counterpoint debate on issues of interest to the learning community, and an additional source of feedback that they could use to monitor and assess present and future learning.

The power of collaborative learning communities, both within and beyond the physical classroom, is well documented in the research (see, e.g., Bruffee, 1993; Crook, 1994; Gabelnick, MacGregor, Matthews, & Smith, 1990; Kahn, 1999). Through a process of collaborative, constructive, and creative activities, these learning communities provide the context for students to create, share, apply, and critique their own new knowledge, rather than just absorb knowledge created by others. Allowing students to participate actively in their own learning and to play alternating roles as knowledge receivers, knowledge providers, and knowledge designers (Kahn, 1999) increases self-efficacy, fosters their active processing of interdisciplinary themes and concepts, encourages them to reconstruct and accommodate existing ideas and make personal connections with learning, and builds metacognitive knowledge associated with enhanced task performance (Kasper, 1997b). Additionally, membership in both face-to-face and electronic learning groups teaches ESL students community norms and helps them develop a sense of personal efficacy and social affiliation (Sproull, 1998). According to the NLG (1996), such collaborative learning communities facilitate literacy development because "when learners juxtapose [their differences], they gain substantively in metacognitive and metalinguistic abilities and in their ability to reflect critically

on complex systems and their interactions" (p. 69). Here it is important to note that the interaction of situated practice with overt instruction (which provides the metalanguage) and critical framing (which introduces the critical reflection) is necessary for students to learn how to take a critical stance on the issues under discussion.

Overt Instruction

There are two main ways in which overt instruction was an integral feature of the content-based model described here. First, in this study general class activities were designed to teach students vocabulary and language structures and to provide them with day-to-day practice in complex interdisciplinary texts. These general class lessons provided overt instruction on how to dissect a text, search for clues to meaning, and compose cogent responses to inferential questions and essay prompts. Moreover, to provide each of the students in the course with a foundation in the focus disciplines chosen for study by individuals, the entire class read and responded to essays written about the chosen subject areas. In this way the entire class acquired the linguistic and cognitive skills needed to participate in an intelligent discussion of each of the individual focus disciplines studied in the course.

Second, the focus discipline research topics were instructor generated and progressively structured into a series of several short papers and two longer research projects. The short (i.e., two to three page) papers were designed to develop language and literacy skills as students gradually built a base of knowledge in their focus discipline. Here students benefitted from the interactive effects of overt instruction and transformed practice as their developing base of knowledge was further expanded through in-class or online focus discipline group discussion of salient issues under study. Their growing base of knowledge provided the foundation for the two longer assignments. In the first, each individual student was responsible for writing a five to seven page research paper on an assigned topic within the focus discipline. The second research project was a group effort; each member of the focus discipline group was required to research and write about one related aspect of the assigned topic. Working together, the group then synthesized these writings into a coherent research report.

Students produced multiple drafts of each piece of writing, both long and short. Students received both peer and instructor feedback, and with each subsequent revision, worked to express themselves more fluently, clearly, and correctly. Students in this study made extensive use of Internet resources to help them develop linguistic accuracy and build writing skills. The course Web page provided students with links to a variety of sites, for example, Dave's ESL Café, EnglishPractice.com, and The Purdue Online Writing Lab. Students were able to access these sites at any time and so had readily available a large body of interactive exercises that they could use to target and work on the specific forms and structures they found problematic. Students in the study said that they enjoyed using these computer-based resources because of the greater range of items with which to practice, the interactivity and immediate feedback provided, and the chance to repeatedly return to tackle difficult or confusing items again and again.

Students' efforts to improve the clarity and linguistic accuracy of their written work were well rewarded. The final versions of the focus discipline essays and research projects produced by students in this study were extremely thoughtful and coherent examples of strong academic writing which demonstrated not only improved literacy skills, but also a growing ability to critically frame and analyze intra- and extra-systematic relationships. For example, in a focus discipline project on eating disorders, a young woman from Poland, who had chosen diet and nutrition as her focus discipline, presented a detailed analysis of the causes and effects of anorexia and bulimia. In her analysis, she examined cross-disciplinary relationships as she articulated the social, biological, and psychological factors involved in eating disorders. She also explained how she had applied her newly gained knowledge of eating disorders to events in her own life. She expressed how her research had led her to a greater awareness of the possibility that one of her friends might be suffering from an eating disorder and how she was able to help this friend recognize her problem.

Student writing was published on the course Web page, and students were encouraged to submit their revised pieces for publication. Most students in the class were eager to do this, and these writings became additional course texts used to expand interdisciplinary knowledge. Students were asked to read and respond to each other's writings published on the Web. They were given a list of reader response questions to answer and were asked to post their responses to the course discussion list, CBESL. Technology here provided the student authors not only with the means for having their work read by a wide audience, but also with the opportunity to discuss it with that same audience. The reader responses exposed the student authors to various perspectives on their writing and research. The responses introduced critical framing by giving student writers a chance to rethink their positions as they opened up an electronic dialogue with a variety of readers other than the instructor. Composing the responses also forced students to view writing from the perspective of a reader and helped to make them aware of the elements that make writing clear or confusing.

Both general course and focus discipline research activities were structured to help students develop research and argumentation skills. Overt instruction was used to teach them how to search for information, evaluate resources, construct and support a point of view, and cite references used. Scaffolding was provided through a guided research activity, as well as through instructor and peer feedback. The guided research activity provided students with a series of questions which taught them not only how to search for information on the Internet, but also how to evaluate the resources they found there. After completing their search, students shared the resources found and their responses to them with the instructor and the peer group, and received feedback from both sources.

As described here, overt instruction is key to students' success on the focus discipline research task, since as Horowitz (1986) noted, left on their own to produce a series of academic research papers, some, if not all, might find the task an insurmountable challenge to their English language skills. However, because focus discipline research represents a progressive and highly structured task, with a good deal of scaffolding, students' success is facilitated. Students in this study learned the vocabulary and language structures necessary to comprehend informational resources and to articulate the results of their research. They learned how to evaluate the quality of those resources. Finally, by discussing their research with peers, both in class and online, students were able to discover connections between concepts and issues in the discipline(s) being studied. In this way, they learned how to build and articulate knowledge and became more aware of effective learning strategies.

Critical Framing

As students completed each of their focus discipline essays and projects, they consistently were required to define problems, examine evidence collected from a variety of sources, and make objective judgments on the basis of their extended research. The entire process offered students multiple opportunities and contexts in which to synthesize and critically frame knowledge.

Students in this study were asked to analyze and articulate their understanding of how intra and/or extrasystematic relationships applied to salient issues in the focus discipline; this engendered knowledge synthesis, in which students needed to link together information gleaned from the various texts read and written in the course. Such knowledge synthesis requires a deeper level of information processing and, through spreading activation, promotes the creation of a richly connected cognitive network of interdisciplinary associations (Anderson, 1983b) that can be used to facilitate future learning (Nelson & Schmid, 1989).

As students in this study examined intra- and extra-systematic relationships, they revisited not only what they had learned about their own focus discipline, but also what they had learned, through class readings and group discussions, about other focus disciplines studied in the course. For example, students who chose to study business as a focus discipline were asked to research and analyze key issues influencing sales and advertising. In one of their focus discipline papers, students considered the effects of a particular

advertising medium on the sales of different types of products. Explaining these relationships required that students critically analyze issues within and across a number of different disciplines, including business, psychology, sociology, technology, and popular culture.

Articulating critical intra- and extra-systematic relationships encourages students to grapple with "the historical, social, cultural, political, ideological, and value-centered relations of particular systems of knowledge and social practice" (NLG, 1996, p. 86) and to put focus discipline themes and issues into a broader context. When students are able to put these themes and issues into a broader context, when they are able to reframe and view them through the lens of other disciplines, they enter a higher stage of learning. The situated practice and overt instruction that students receive helps them develop the ability to engage in transformed practice, as they transfer what they have learned to new and varied contexts and to discover intra- and interdisciplinary connections that can be used to facilitate all future learning.

Transformed Practice

Empowering ESL students to engage in transformed practice is in fact the ultimate goal of collaborative focus discipline research pedagogy as described here. Cummins and Sayers (1995) advised that activities that engender a process of critical inquiry within the context of collaborative partnerships provide students with a strong foundation for transformed practice by injecting a critical perspective into learning. As members of collaborative learning communities, ESL students are encouraged to continually revisit, rethink, and often revise their beliefs in response to questions posed by others in the group. This promotes a process of critical reflection which is integral to transformed practice.

Although developing the ability to critically reflect on issues is a goal of literacy education, Imel (1998) cautioned that it is sometimes difficult to achieve this goal. Critical reflection requires that the learner move beyond "the acquisition of new knowledge and understanding into questioning existing assumptions, values, and perspectives" (Cranton, 1996, p. 76). This can be unsettling, particularly in a group context, where the learner may be confronted and challenged to examine the extent to which personal values affect attitudes, beliefs, and ideas (Imel, 1998).

The critical reflection that accompanies transformed practice forces students to become aware of and to challenge their beliefs; this process may be not only challenging but also troubling to ESL learners. To facilitate the process, instructors must be sure to support ESL learners as they engage in activities that demand critical reflection. Focus discipline study can provide a supportive context through which students may develop the ability to engage in critical reflection through their interactions within a community of peers "engaged in common practices centered around a specific ... domain of knowledge" (NLG, 1996, p. 82). To illustrate, as ESL students, each of the participants in this study was actively involved in acquiring a second language, and although none of them had chosen to study linguistics as a focus discipline, the principles inherent in effective second language acquisition were both interesting and relevant to them in their attempts to build the literacies required for success in college and the workforce. For this reason the course incorporated activities that required all students to reflect on the ways in which psychological and sociological issues influence language acquisition. They read, discussed, and wrote about the way(s) in which individual and group needs influence language use. They were encouraged to connect their understanding of these influences to their own experiences as second language learners. Doing this required that these ESL students reflect on their place in a new linguistic, social, and cultural system, and sometimes raised some difficult issues that they have had to face in pursuing their goals and defining their identities.

As both immigrants to a new country and second language learners, ESL students are forced to critically examine and redefine all aspects of self, their social identities transformed in complex ways (Ullman, 1997). A number of them experienced an abrupt transformation of social identity as they went from being

respected professionals in their native country to being students of limited English proficiency. Many ESL students are also conflicted in terms of their desire to learn English and be accepted as full members of an English-speaking culture, and their desire to maintain a deep and lasting connection to their native language and culture.

As they studied the psychological, sociological, and cultural factors that impact second language acquisition, students were encouraged to examine their own experiences and viewpoints. The goal of this reflective practice is to help students move beyond a general understanding of the factors involved in second language acquisition to a more specific and personal understanding of the influence these factors have had on their own lives. As part of the collaborative model described here, each student was supported in his or her personal critical reflection by peers who were simultaneously engaged in their own process of critical reflection and who were experiencing similar conflicts with regard to their linguistic and cultural identities.

As Scholfield (1995) noted, useful introspection about experiences, including language learning experiences, can help students develop metacognitive awareness of the learning process. Studies (see, e.g., Devine, Railey, & Boshoff, 1993; Kasper, 1997b; Kellogg, 1994) have shown that developing a strong metacognitive knowledge base facilitates second language learning, and according to the work of Devine (1993), may play an even more important role than linguistic competence in skills like writing. Therefore, incorporating activities that promote transformed practice by encouraging students' critical examination of their learning experiences and the results of those experiences can help build the range of functional, academic, and critical skills defined here as multiliteracies.

Students in this study were also actively involved in a process of transformed practice as they worked together to research and write the group research project. While designing and composing the group project, students had to simultaneously apply and revise what they had learned about their focus discipline to accommodate the interpretation of information contributed by others in the group. Then in the process of synthesizing knowledge gathered by each member of the group, they needed to put this understanding to work to enable them to reach their personal and group goals in a way consistent with their own values. This was not an easy task for students, as their responses to feedback questionnaires indicated. Although 95% of students said they believed that this writing assignment had been a valuable experience (specifically because it had taught them how to work with other people), they also said that dealing with so many different viewpoints was difficult. However, they indicated that writing in a group had taught them the necessity of listening to and respecting one another's opinions and of working out compromises when there was disagreement among the group members. Nevertheless, although all of the students thought that discussing focus discipline topics and sharing information with the group was very beneficial in terms of acquiring and building knowledge, most did not believe that the written articulation of knowledge should be a group effort. As they reflected on the experience, students gained a deeper understanding of themselves as learners and of their preferred learning strategies.

ASSESSING STUDENTS' ACQUISITION OF MULTILITERACIES

The theoretical models upon which focus discipline research is based advocate a view of assessment as a developmental process used to guide learners so that they may acquire the skills they need to function in and contribute to the community. Viewed as a developmental process, assessment becomes a multifaceted construct that describes the process of learning by addressing a wide variety of skills, including communicative competence, appropriate use of language, problem solving, and concept comprehension (Short, 1993). Ideally speaking, assessment should reflect an understanding of learning as multidimensional, integrated, and revealed in performance over time. This view of assessment was embodied in the range of assignments of progressive complexity that constituted both the process and the product of the focus discipline research carried out by students in this study.

Unfortunately however, although ESL faculty may believe that the power of assessment should derive from conceiving it as a cumulative process, requiring attention not only to outcomes, but also equally to the experiences that lead to those outcomes, assessment measures are too often dictated by academic institutions and consist of summative examinations in which a discrete test score determines a student's progress. This is particularly true at the college level, where many of our students must attain satisfactory scores on institutional assessments of basic literacy skills like reading and writing in order to progress in the ESL sequence, enter the academic mainstream, and ultimately fulfill their academic and professional goals. Such is the case for ESL students at KCC, who must take end of semester reading and writing assessments, the results of which determine their future progress in college.

Assessment of Writing Skills

At KCC, students' writing skills are assessed formatively through a portfolio of revised essays produced over the course of the semester, as well as summatively by a timed essay examination taken at the end of the semester. At the end of the semester, students submit a writing portfolio, which consists of a cover letter to the reader, two revised pieces, including all drafts, and the essay examination. Portfolios are cross-graded by another instructor of ESL 91, and this instructor's rating determines the portfolio grade. All instructors' ratings are normed to a departmental standard of what constitutes a passing portfolio. The portfolio may be rated as either *S* (satisfactory) or *U* (unsatisfactory) in each of three categories: *Finding and Organizing Material, Developing and Refining Ideas,* and *Mechanical Accuracy*. To pass, a portfolio must be rated as Satisfactory in each of these three categories.

The cover letter provides the portfolio reader with some background on the student writer. Students are asked to tell the reader how they believe their writing ability has developed over the course of the semester, to indicate what weaknesses still remain in their writing, and to explain why they chose the particular revised pieces they included in their portfolio. The revised pieces with drafts represent the essay topics that students have worked on during the semester and so are formative in nature. Students, with the help of their teacher, choose the two revised pieces that they will include in their portfolio. The revised pieces should represent the student's best work and should demonstrate the progression of skill as the student writer worked on refining and clarifying ideas and presenting them in accurate language.

In contrast, the examination essay is an essay written in response to a reading text of several pages. The topic of the reading text may vary from "The Origins of Language" to "Educational Systems in Various Cultures" to "Changing Values in the Family." Students are given the reading passage several days before the examination, so that they may read it at home and discuss its content in class. On the day of the writing examination, they are asked to choose one of two writing prompts based on the reading and are given two hours to compose a clear, well-organized, and grammatical essay in response to the prompt. The reading passage and writing prompts are designed by the English Department.

Assessment of Reading Skills

Like the examination essay that forms part of the overall process of writing assessment, the process of reading assessment is also summative. Each student's reading skill is assessed through a timed departmental final examination that requires them to read and interpret an academic text, and to compose short written answers to various types of open-ended questions. Students have two hours to complete the reading examination and must answer a minimum of 65% of the questions correctly to pass it. Like the portfolio, the reading examination is cross-graded by another instructor of ESL 91, whose rating determines the reading grade. All instructors' ratings are normed to a department standard of what constitutes a correct answer. According to English department policy, the same instructor may not grade both the reading examination and the portfolio.

Potential Outcomes of Testing

To understand the outcomes of this study, it is useful for the reader to understand the system of assessment and promotion at KCC. Based on their performance on these end-of-semester assessments, students may progress from ESL 91 to ENG 92 or ENG 93. Students who pass either reading or writing, but not both, progress to ENG 92, considered the level following ESL 91. Like ESL 91, ENG 92 is an integrated developmental reading/writing course that meets 6 hours per week over a twelve-week semester. It is important to note that students at both the ESL 91 and ENG 92 levels take the same final reading examination. While students are given the opportunity to exit developmental reading from the ESL 91 level, many do not. However, some students progress sufficiently to pass both the reading and the writing assessments; those who do are able to skip a level of instruction and progress to ENG 93. ENG 93, the final course in the developmental sequence, focuses on refining academic writing skills and meets 4 hours per week over a twelve-week semester.

Outcomes of the Study: Focus Discipline Research and Students' Progress

The first research question investigated by this study was: When compared with other ESL students at the same level, did the students who engaged in focus discipline research over the course of the twelve-week semester attain significantly higher scores on end-of-semester reading and writing examinations? Here it is necessary to note that while all ESL 91 classes at KCC follow a content-based curriculum (see Kasper, 2000a, for a full discussion of various content-based curricular models), no classes except my own participate in focus discipline research. In addition, computer technology is not an integral part of any of the other ESL 91 classes, due to limited resources and lack of teacher experience in using it.

The analyses described here compared the performance of the 50 students in my two sections of ESL 91 with that of five other ESL 91 sections, or a total of 125 other students. All students placed into ESL 91 based on the same reading and writing assessments and the linguistic and ethnic backgrounds of students was consistent across all sections.

The results of this study suggest that ESL students' performance on individual tests of reading and writing was enhanced as a result of focus discipline research. In terms of their performance on the portfolio assessment of writing skill, the pass rate for students who engaged in focus discipline research was significantly higher than the pass rate for all other ESL 91 students enrolled during the same semester of instruction (83% vs. 54%; chi-square = 6.14; $p < .02$). In terms of their performance on the assessment of reading skill, the pass rate for students who engaged in focus discipline research was also significantly higher than the pass rate for all other ESL 91 students enrolled during the same semester of instruction (69% vs. 46%; chi-square = 4.6; $p < .05$).

However, although it was effective in developing proficiency in basic literacy skills for the students in this study, did focus discipline research pedagogy improve these skills sufficiently to enable students to pass both reading and writing and thereby allow them to skip a level of instruction? When the percentage of students who were able to advance to ENG 93 was compared by a chi-square test, significant differences were found. Therefore, the response to the second research question is affirmative: A significantly greater percentage of students who engaged in focus discipline research passed both reading and writing and so were able to skip a level to advance to ENG 93 (59% vs. 33% for other ESL 91 students enrolled during the same semester of instruction; chi-square = 7.34; $p < .01$).

The preceding results suggest that focus discipline research is effective in building basic literacy skills like reading and writing. It also appears that the focus discipline research yields greater benefits to literacy development than does other content-based pedagogy. However, do these benefits derive from focus discipline research itself or does the integration of technology further facilitate literacy development?

This leads to the third research question, which asks whether the pass rates of students exposed to focus discipline research plus technology were significantly higher than those of students exposed to focus discipline research alone. Answering this research question requires a post hoc examination of pass rates attained by students in my ESL 91 course in previous semesters before technology was made an integral component of the focus discipline pedagogy.

Although I had instituted focus discipline research pedagogy into my courses as early as 1997, at that time, electronic technology resources were not made available to ESL students at my college. For this reason my early focus discipline research pedagogy involved having students work in groups, as they did in this study, but using traditional print resources available in the college library for their research. The reading texts and writing prompts were the same, as were the institutional assessments that students were required to take at the end of the semester. Likewise, as they are at present, students in 1997 had initially been placed in ESL 91 based upon their scores on the CUNY Writing and the CUNY Reading Assessment Tests. Finally, the ethnic and linguistic backgrounds of my former ESL 91 students were essentially the same as those in the present study.

The post hoc examination of pass rates attained in 1997 by two sections, or a total of 50 students, who engaged in focus discipline research without the benefit of electronic technology resources, revealed that these students had achieved a pass rate of 75% on the writing assessment. As stated previously, students in the present study, who engaged in focus discipline research with technology, achieved a pass rate of 83%. Although the pass rate is higher for those students who used technology, differences in these percentages are not statistically significant based on a chi-square test. In contrast, significant differences were found in a comparison of the pass rates on the reading examination. While 69% of the students who engaged in focus discipline research with technology passed the reading examination, only 47% of the students who had engaged in focus discipline research without technology passed it. This difference is significant by a chi-square test (chi-square = 4.17; $p < .05$).

Thus, for the ESL 91 students at my college, technology use appears to have significantly facilitated reading skill development, while leaving writing skill development basically unchanged. In view of the writing requirements involved in doing focus discipline research, this result is not entirely surprising. Whether students used electronic or traditional print resources, the writing assignments required them to articulate and synthesize knowledge. Moreover, with or without technology, students worked collaboratively in focus discipline groups. As Bruffee (1993) and others have noted, collaborative learning communities, be they face-to-face or online, encourage active participation in learning, foster processing of interdisciplinary themes and concepts, and teach students how to construct and articulate the knowledge they need in order to produce strong written projects.

This finding does bring into question the value of having students post to electronic discussion lists like CBESL. Although the course required students to post to the list on a regular basis, these posts were rather informal in nature, consisting essentially of personal opinions and experience. As Leki and Carson (1994) noted, "writing tasks that require students only to tap their own opinions and experiences" (p. 95) do not provide them with practice in nor adequately prepare them to produce the structure and discourse modes inherent in academic writing. Thus, although their postings to the list did provide the ESL students in this study with additional opportunities to produce written English, these postings did not offer students a model for the type of academic pieces they were required to produce for the writing assessment.

In contrast, technology appears to have facilitated the development of students' reading skills. Once again, this result is not entirely surprising. Students who use the information technology resources available on the Internet have immediate access to a far wider variety of texts than is available in the college library. Students would need to spend many hours in the college library to access even a small percentage of the informational sources available to them online. As one of my ESL 91 students noted, an effective Internet search can turn up many more "hits" in far less time than a trip to the college library.

Furthermore, when compared to traditional print, reading hypertext is not only a more active, but also a much more interactive process. Searching through and reading hypertext is a naturally dynamic, recursive, and integrated process, and therefore provides ESL students with multiple opportunities to acquire, test, and reframe knowledge. Traditional print texts are static and unchanging, determined by the interests and purposes of the author. In contrast, as Warschauer (1999) noted, the texts created when students pursue hyperlinks are dynamic and determined by each particular student's own interests and purposes. In addition, by following new and different links during subsequent online sessions, student readers are continually creating new texts that expose them to varied perspectives on issues studied. Moreover, because it fosters a nonlinear pattern of exploration and discovery, reading hypertext helps to promote the cognitive flexibility necessary for the integration and consolidation of knowledge gleaned from a variety of sources.

Nonlinear hypertext can offer students each of the benefits noted above; however, without overt instruction in how to navigate hypertext effectively, students may become lost in a sea of information, potentially experiencing cognitive overload (Rouet & Levonen, 1996). Guided practice that takes students through a hypertext document enables them to acquire the cognitive strategies necessary for them to navigate and comprehend nonlinear texts.

By allowing easy access to multiple cross-references on related topics across several documents, or screens, hypertext encourages students to read widely, and exposes them to a variety of perspectives as well as to varied vocabulary and language structures. In previous semesters, the students who had used print resources for focus discipline research had ready access to a limited number of texts–three readings for each focus discipline in their textbook, as well as several books available in the college library. In contrast, students in the present study who used hypertext resources had ready access to a far greater range of material. As a result, these students read more texts over the course of the semester. As Nelson and Schmid (1989) found, and as this study supports, when students continually engage in this type of extensive and extended reading, vocabulary and language structures become increasingly familiar, intertextual associations become clearer, and a broader base of schematic knowledge that may be used to guide the construction of meaning of subsequent texts like the final readng assessment is developed.

STUDENT FEEDBACK

The foundations of the pedagogical method described here require that students themselves play an active role in assessing the efficacy of the learning process. For this reason, one component of the third research question involved students' own perceptions of the benefits of technology-enhanced focus discipline research on their acquisition of literacy skills. At the end of the semester, students were asked to complete an online questionnaire requesting their feedback on the overall learning experience. This feedback questionnaire asked students to evaluate the usefulness of doing focus discipline research, the value of working with the focus discipline group and to provide their insights on the experience of writing the individual and group projects. In addition, the questionnaire asked students to describe what they believed to be the most helpful aspect of the course.

In their responses, ESL students indicated a belief that participating in focus discipline research helped them develop linguistic, academic, social, and technological skills. Specifically, 98% of these students mentioned a greater awareness of their own ability to conduct research and report findings; 90% noted the confidence that comes from being able to map out a project and see it come to fruition; 80% expressed the pride in gaining important knowledge and insights, the enthusiasm generated by mastering new technologies, and the excitement of sharing newly-gained knowledge with peers and teachers.

Students also appreciated being given the responsibility of becoming the assessors of learning as they discussed and critiqued both their own and others' interpretations of resources. They believed that the

classroom methodology and the focus discipline group provided them with a supportive context in which to build the skills they needed to monitor learning and effectively articulate the results of their research. Finally, many students noted that teamwork is a part of many jobs, and they said that learning how to work with other people would be very helpful when they entered the workforce.

Students also extolled the value of using technology in support of their focus discipline research. They mentioned the ease with which they could find information from a variety of sources; they were also cognizant of the necessity of evaluating Internet resources carefully. Seventy-five percent of students indicated that they now viewed all information more critically than they had before; they were less likely to accept something as fact just because it was published, either in print or online. They all believed that the skills they had learned in this class would serve them well in their future classes as well as in the workforce.

Ninety-eight percent of the students stated that the most helpful aspects of the course were having the opportunity to do focus discipline projects and to learn how to use the Internet for research. They said that the experience of conducting and writing up the results of extended research would help them in their future college classes. Ninety-eight percent of the students noted that experience with technology is now a required skill for college courses and for most jobs. Even students who entered the course with little experience with technology said that completing the various activities in this course made them feel confident in their ability to use technology for a variety of tasks and purposes.

CONCLUSION

Focus discipline research appears to have been effective in enabling the students who participated in this study to develop and hone the multiliteracies they need to participate and succeed not only in ESL learning communities, but also in academic, social, and professional contexts beyond the ESL classroom. From the viewpoint of the instructor and the institution, the quality of their projects and their scores on final examinations support these ESL students' increased literacy skills. As evinced by the body of written work they produced, students were able to present the results of their research efforts in a coherent, well-organized format that articulated and explained complex intra- and interdisciplinary relationships.

This ability, as well as their performance on institutionally mandated reading and writing examinations, clearly demonstrates their growing literacy skills.

Although its outcomes are encouraging, this study represents only a preliminary research effort, and certainly many more studies are needed before definitive claims can be made about the ways in which multiliteracies are most effectively acquired. Nevertheless, the results of this study suggest that ESL students can develop the range of skills that constitute multiliteracies through a content-based pedagogy like focus discipline research that fosters a learning environment within which students become partners and participants in meaningful interaction with peers and teachers to design learning contexts, examine interdisciplinary issues, and articulate knowledge.

NOTES

1. For the purposes of this paper, the high intermediate level is defined as an entry TOEFL score of 425.
2. See note 1
3. Students choose their focus discipline from among the 10 subject areas--linguistics, environmental science, computer science, mathematics, business and marketing, psychology, sociology, physical anthropology, biology, and diet and nutrition--represented in the course text, *Interdisciplinary English* (Kasper, 1998c).
4. Although college e-mail accounts were available, these accounts could only be accessed through the campus network and expired at the end of the semester. Thus, to provide students with

permanent e-mail accounts they could access from home as well as in school, individual e-mail accounts were set up through Yahoo mail.

5. It should be noted that the electronic resources used in this study were primarily text-based, so that although students often encountered audio and video clips during their individual Internet research, audio and video technologies were not inherent components of the course design.

ABOUT THE AUTHOR

Loretta F. Kasper is Associate Professor of English at Kingsborough Community College/CUNY. The author of *Content-Based College ESL Instruction, Teaching English Through the Disciplines: Psychology, Interdisciplinary English,* and numerous scholarly articles and book chapters, she also owns and moderates the listservs Content-ESL and Instructionaltech. Her recent research involves Internet applications in ESL instruction.

E-mail: Drlfk@aol.com

REFERENCES

Anderson, J. R. (1983a). *The architecture of cognition.* Cambridge, MA: Harvard University Press.

Anderson, J. R. (1983b). A spreading activation theory of memory. *Journal of Verbal Learning and Verbal Behavior, 22,* 261-295.

Benesch, S. (1988). *Ending remediation: Linking ESL and content in higher education.* Washington, DC: TESOL.

Brinton, D. M., Snow, M. A., & Wesche, M. B. (1989). *Content-based second language instruction.* Boston: Heinle and Heinle.

Brown, G. (2000, January/February). Where do we go from here? *The Technology Source.* Retrieved January 5, 2000, from the World Wide Web: http://horizon.unc.edu/TS/reading/2000-01.asp.

Bruffee, K. A. (1993). *Collaborative learning: Higher education, interdependence, and the authority of knowledge.* Baltimore: Johns Hopkins University Press.

Chamot, A. U., & O'Malley, J. M. (1994). *The CALLA handbook: Implementing the cognitive academic language learning approach.* Reading, MA: Addison-Wesley.

Chun, D. M., & Plass, J. L. (1997). Research on text comprehension in multimedia environments.*Language Learning and Technology, 1*(1), 60-81. Retrieved July 15, 2000, from the World Wide Web: http://llt.msu.edu/vol1num1/chun_plass/default.html.

College Board. (1978). *Descriptive test of language skills (DTLS).*

Crandall, J. (1993). Diversity as challenge and resource. In *Proceedings on the Conference on ESL Students in the CUNY Classroom: Faculty Strategies for Success* (pp. 4-19). New York: CUNY.

Cranton, P. (1996). *Professional development as transformative learning: New perspectives for teachers of adults.* San Francisco, CA: Jossey-Bass.

Crook, C. (1994). *Computers and the collaborative experience of learning.* London: Routledge.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In California State Department of Education (Ed.), *Schooling and language minority students.* Los Angeles, CA: Evaluation, Dissemination, and Assessment Center.

Cummins, J., & Sayers, D. (1995). *Brave new schools: Challenging cultural illiteracy through global learning networks.* New York: St. Martin's Press.

CUNY Task Force on Writing. (1983). *The CUNY Writing Skills Assessment Test: Short essays evaluated and annotated by the CUNY Task Force on Writing.* New York: CUNY Task Force on Writing.

Devine, J. (1993). The role of metacognition in second language reading and writing. In J. G.Carson & I. Leki (Eds.), *Reading in the composition classroom: Second language perspectives* (pp. 105-127). Boston: Heinle and Heinle.

Devine, J., Railey, K., & Boshoff, P. (1993). The implications of cognitive models in L1 and L2 writing. *Journal of Second Language Writing, 2*, 203-225.

Gabelnick, F., MacGregor, J., Matthews, R. S., & Smith, B. L. (1990). Learning communities: Creating connections among students, faculty, and disciplines. *New directions for teaching and learning, No. 41*. San Francisco: Jossey-Bass.

Horowitz, D. (1986). What professors actually require: Academic tasks for the ESL classroom. *TESOL Quarterly, 20*(3), 445-462.

Imel, S. (1998). Teaching critical reflection. *ERIC Trends and Issues Alerts* (00071). Retrieved May 17, 1999, from the World Wide Web: http://ericacve.org/docs/tia00071.htm.

Johns, A. M. (1997). *Text, role, and context: Developing academic literacies.* Cambridge: Cambridge University Press.

Kahn, T. (1999, Spring). Designing virtual communities for creativity and learning. *Edutopia* Retrieved April 27, 1999 from the World Wide Web: http://www.glef.org/edutopia/newsletters/6.2/kahn.html.

Kasper, L. F. (1997a). The impact of content-based instructional programs on the academic progress of ESL students. *English for Specific Purposes, 16*(4), 309-320.

Kasper, L. F. (1997b). Assessing the metacognitive growth of ESL student writers. *TESL-EJ, 3*(1). Retrieved January 6, 2000, from the World Wide Web: http://www-writing.berkeley.edu/TESL-EJ/ej09/a1.html.

Kasper, L. F. (1998a). ESL and the Internet: Content, rhetoric, and research. In W. E. Tanner & S. S. Webb (Eds.), *Proceedings of Rhetoric and Technology in the Next Millennium* [CD-ROM]. Mesquite, TX: Caxton's Modern Art Press. Retrieved January 6, 2000, from the World Wide Web: http://members.aol.com/Drlfk/rhetoric.html.

Kasper, L. F. (1998b). Meeting ESL students' academic needs through discipline-based instructional programs. In T. Smoke (Ed.), *Adult ESL: Politics, pedagogy and participation in classroom and community programs* (pp. 147-157). Mahwah, NJ: Lawrence Erlbaum Associates.

Kasper, L. F. (1998c). *Interdisciplinary English* (2nd ed.). New York: McGraw-Hill.

Kasper, L. F. (2000a). *Content-based college ESL instruction.* Mahwah, NJ: Lawrence Erlbaum Associates.

Kasper. L. F. (2000b). Sustained content study and the Internet: Developing functional and academic literacies. In M. Pally (Ed.), *Sustained content-based teaching in academic ESL/EFL: A practical approach* (pp. 54-73). Boston: Houghton Mifflin.

Kellogg, R. T. (1994). *The psychology of writing.* New York: Oxford.

Krashen, S. (1982). *Principles and practice in second language acquisition.* Oxford, UK: Pergamon.

Leki, I., & Carson, J. G. (1994). Students' perceptions of EAP writing instruction and writing needs across the disciplines. *TESOL Quarterly, 28*(1), 81-101.

Luke, A., & Elkins, J. (1998). Reinventing literacy in "New Times." *Journal of Adolescent and Adult Literacy, 42*(1), 4-7.

McGrath, B. (1998, April). Partners in learning: Twelve ways technology changes the teacher-student relationship. *T.H.E. Journal.* Retrieved May 16, 1999, from the World Wide Web: http://www.thejournal.com/magazine/vault/A1982.cfm.

Mohan, B. (1990, September). LEP students and the integration of language and content: Knowledge structures and tasks. In *Proceedings of the research symposium onlimited English proficient students' issues* (pp. 113-160). Washington, DC: Office of Bilingual Education and Minority Language Affairs.

Moll, L. C. (1994). Literacy research in community and classrooms: A sociocultural approach. In R.B. Ruddell, M.R. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading, 4th edition* (pp. 179-207). Newark, DE: IRA.

Neilsen, L. (1989). *Literacy and living: The literate lives of three adults.* Portsmouth, NH: Heinemann/Boynton-Cook.

Nelson, G., & Schmid, T. (1989). ESL reading: Schema theory and standardized tests. *TESOL Quarterly, 23*, 539-543.

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review, 66*(1), 60-92.

Pally, M. (1997). Critical thinking in ESL: An argument for sustained content. *Journal of Second Language Writing, 6*(3), 293-311.

Pally, M. (Ed.). (2000). *Sustained content-based teaching in academic ESL/EFL: A practical approach.* Boston: Houghton Mifflin.

Rouet, J. F., & Levonen, J. J. (1996). Studying and learning with hypertext: Empirical studies and their implications. In J. F. Rouet, J. J. Levonen, A. Dillon, & R. J. Spiro (Eds.), *Hypertext and cognition* (pp. 9-23). Mahwah, NJ: Lawrence Erlbaum Associates.

Scholfield, P. (1995). *Quantifying language.* Clevedon, UK: Multilingual Matters.

Shetzer, H. (1998, March). *Electronic literacies: Bridging the gap.* Paper presented at the 1998 conference of Teachers of Speakers of Other Languages, Seattle, WA. Retrieved July 21, 1999, from the World Wide Web: http://www.eslplanet.com/tesol98/literacy/electlit.html.

Short, D. J. (1993). Assessing integrated language and content instruction. *TESOL Quarterly, 27*(4), 627-656.

Snow, M. A., & Brinton, D. B. (Eds.). (1997). *The content-based classroom: Perspectives on integrating language and content.* New York: Longman.

Snow, M. A., Met, M., & Genesee, F. (1989). A conceptual framework for the integration of language and content in second/foreign language instruction. *TESOL Quarterly, 23,* 201-217.

Soter, A. O. (1990). The non-English-speaking student. In G. E. Hawisher & A. O. Soter (Eds.), *On literacy and its teaching* (pp. 224-242). Albany, NY: State University of New York Press.

Spanos, G. (1989). On the integration of language and content information. *Annual Review of Applied Linguistics, 10,* 227-240.

Sproull, L. (1998, November 12). *A database is not a community: Important social dynamics in online groups.* Keynote address presented at WebNet '98, Orlando, FL.

Tierney, R. J., Kieffer, R., Whalin, K., Desai, L., Moss, A. G., Harris, J. E., & Hopper, J. (1997, May). Assessing the impact of hypertext on learners' architecture of literacy learning spaces in different disciplines: Follow-up studies. *Reading Online.* Retrieved May 21, 1999, from the World Wide Web: http://www.readingonline.org/research/impact.

Ullman, C. (1997). Social identity and the adult ESL classroom. *ERIC Digest* (EDO-LE-98-101). Retrieved May 28, 1999, from the World Wide Web:http://www.cal.org/ncle/digests/Socident.htm.

United States Department of Education (1995, August). Technology supports for project-based learning. *Technology and Education Reform: Technical Research Report* Retrieved May 16, 1999, from the World Wide Web: http://www.ed.gov/pubs/SER/Technology/ch8.html.

Warschauer, M. (1999). *Electronic literacies: Language, culture, and power in online education.* Mahwah, NJ: Lawrence Erlbaum Associates.

Zuengler, J., & Brinton, D. (1997). Linguistic form, pragmatic function: Relevant research from content-based instruction. In M. Snow & D. Brinton (Eds.), *The content-based classroom: Perspectives on integrating language and content* (pp. 263-273). White Plains, NY: Longman.